What is claimed is:

Claim 1. A process for transmitting a transmission payload data bit-stream through a free-space medium, said process comprising the steps of:

encoding a transmission payload data bit-stream into codewords;

fragmenting each said codeword into segments;

in a SDRAM buffer store having an entry receive and transmit rate and comprising a matrix of memory cells, defining an x-y submatrix of said cells representing the set of entries comprising a single SDRAM physical page;

in a WRITE operation having a first page-change overhead operation, interleaving corresponding segments of successive said codewords into said submatrix of cells;

in a READ operation having a second page-change overhead operation, reading out the contents of said submatrix of cells; and

transmitting the encoded and interleaved data-bit stream of said READ operation into said medium;

said WRITE and READ operations into and out of said submatrix of cells being conducted to substantially redistribute page change overhead operations from said WRITE operation to said READ operation, thereby to equalize the rate of said WRITE and READ operations.

Claim 2. The process of claim 1, wherein the step of encoding of said transmission payload data bit-stream into codewords is effected using Reed-Solomon coding.

Claim 3. The process of claim 2, further comprising the step of dimensioning said submatrix of cells such that the minimum matrix dimension representing the number of successive memory references that occur before a page change during a said READ operation is sufficient to amortize SDRAM overhead for a said page change.

Claim 4. The process of claim 3, wherein said redistribution of page change overhead operations from said WRITE operation to said READ operation comprises the further steps of:

WRITING into successive columns of said submatrix cells corresponding segments of successive said codewords comprising a said SDRAM page;

remapping t submatrix cell addresses for READout to maintain the number of columns held on one page to a number that ensures a physical SDRAM page change at intervals which makes the READ and WRITE rates substantially equal.

Claim 5. The process of claim 4, wherein said free-space medium is optical and wherein said transmission payload data bit-stream is optical frequency.

Claim 6. The process of claim 5, comprising the further steps of

sensing conditions in said medium which cause scintillation effects; and

activating said encoding and interleaving steps when said conditions are detected.

Claim 7. The process of claim 6, further comprising the step of deinterleaving and decoding said encoded and interleaved data-bit stream at a remote receiver.

Claim 8. The process of claim 7, wherein

said SDRAM buffer store is large enough to correct an error burst of the order of 20 million bits,

said Reed-Solomon code is of (255,223), format;

said encoding step comprises encoding said incoming data stream into substantially 156,250 codewords to be interleaved;

said codeword size is 2040 bits; and

said segmenting step comprises segmenting each said codeword into 60-bit segments for interleaving.

Claim 9. A process for optical free-space communications wherein the communications medium is subject to intervals of burst error due to atmospheric scintillation, said process comprising the steps of:

using Reed-Solomon coding, encoding a transmission payload data bit-stream into codewords;

fragmenting each of a selected series of said codewords into segments;

interleaving corresponding said segments of said codewords over a substantial span of said payload data-bit stream that is large compared to an anticipated burst error interval;

WRITING said interleaved segments into designated addresses of a permutation buffer comprising banks of SDRAM devices arrayed as a matrix of megaword stores with physical row-and-column addresses

wherein each said row constitutes a page, each said SDRAM device having a burst memory cycle rate;

establishing virtual addresses by designating each physical row in SDRAM memory as multiple virtual pages;

mapping said virtual addresses onto said physical addresses of each said SDRAM device;

READING from said banks of SDRAM devices the content of said actual addresses in a sequence determined by the re-mapped virtual pages, said sequence being chosen in such a way that the processing overhead associated with row-address changes is roughly equal in both said WRITE step and said READING OUT step, thereby to enable each said SDRAM device to operate asymptotically close to its burst memory cycle rate; and

transmitting into said communications medium the encoded and interleaved data-bit stream of said READING step.

Claim 10. The process of claim 9, wherein said WRITING step further comprises writing K consecutive entries into one physical page, and said READING step comprises changing pages every K entries.

Claim 11. The process of claim 10, comprising the further steps of

sensing conditions in said communications medium which cause scintillation effects; and

activating said encoding and interleaving steps when said conditions are detected.

Claim 12. The process of claim 11, further comprising the step of deinterleaving and decoding said encoded and interleaved data-bit stream at a remote receiver to recover said transmission payload data bit-stream.

Claim 13. A process for transmitting and receiving optical free-space communications wherein the communications medium is subject to intervals of burst error due to atmospheric scintillation, said process comprising the steps of:

at the transmitter end; encoding a transmission payload data bit-stream into codewords;

fragmenting each said codeword into segments;

interleaving said codeword segments;

transmitting the interleaved said segments as a data-bit stream into said optical free-space medium;

at the receiver end, receiving said transmitted data-bit stream; and

deinterleaving and decoding said transmitted data-bit stream;

wherein said interleaving step at said transmitter end and said deinterleaving step at said receiver end comprises the further steps of

providing a SDRAM buffer store comprising a matrix of memory cells, and having an entry receive and transmit rate;

defining an x-y submatrix of said cells representing the set of entries comprising a single SDRAM physical page;

in a WRITE operation having a first page-change overhead operation, interleaving corresponding segments of successive said codewords into said submatrix of cells;

in a READ operation having a second page-change overhead operation, reading out the contents of said submatrix of cells;

said WRITE and READ operations into and out of said submatrix being conducted to substantially redistribute page change overhead operations from said WRITE operation to said READ operation, thereby to equalize the rate of said WRITE and READ operations.

Claim 14. Apparatus for transmitting a transmission payload data bit-stream through an optical free-space medium, said apparatus comprising:

means for encoding an optical transmission payload data bit-stream into codewords using Reed-Solomon encoding

means for fragmenting each said codeword into segments;

a SDRAM buffer store having an entry receive and transmit rate and comprising a matrix of memory cells,

said SDRAM buffer store further having a defined repeating x-y submatrix of said cells representing the set of entries comprising a single SDRAM physical page;

means for effecting a WRITE operation to interleave corresponding segments of successive said codewords into said repeating submatrix of cells;

said WRITE operation having an associated first page-change overhead operation,

means for effecting in a READ operation to read out the contents of said submatrix of cells;

said READ operation having an associated second page-change overhead operation,

said WRITE and READ operations into and out of said submatrix of cells being conducted to substantially redistribute page change

overhead operations from said WRITE operation to said READ operation, thereby to equalize the rate of said WRITE and READ operations; and

means for transmitting the encoded and interleaved data-bit stream of said READ operation into said medium.

Claim 15. Apparatus in accordance with claim 14, further comprising means for dimensioning said submatrix of cells such that the minimum matrix dimension representing the number of successive memory references that occur before a page change during a said READ operation is sufficient to amortize SDRAM overhead for a said page change.

Claim 16. Apparatus in accordance with claim 15, wherein said redistribution of page change overhead operations from said WRITE operation to said READ operation further comprises:

apparatus for WRITING into successive columns of said submatrix cells corresponding segments of successive said codewords comprising a said SDRAM page; and

apparatus for remapping submatrix cell addresses for READout to maintain the number of columns held on one page to a number that ensures a physical SDRAM page change at intervals which makes the READ and WRITE rates substantially equal.

Claim 17. Apparatus in accordance with claim 16, further comprising:

means for sensing conditions in said medium which cause scintillation effects; and

means for activating said encoding and interleaving steps when said conditions are detected.

Claim 18. Apparatus in accordance with claim 17, further comprising means for deinterleaving and decoding said encoded and interleaved data-bit stream at a remote receiver.

Claim 19. Apparatus in accordance with claim 18, wherein:

said SDRAM buffer store comprises a storage cell capacity sufficiently large to correct an error burst of the order of 20 million bits;

said Reed-Solomon code is of the (255,223) format;

said encoding means encodes said incoming data stream into substantially 156,250 codewords to be interleaved;

said codeword size is 2040 bits; and

said segmenting means segments each said codeword into 60-bit segments for interleaving in said submatrices of said SDRAM buffer store.